

CLAIMS

What is claimed is:

1 1. A method to detect a weight-set to process a spread spectrum channel
2 comprising:
3 determining a measurement probability for a weight-set from
4 measurements of a current time-slot;
5 determining a transition probability for the weight-set, the transition
6 probability based at least on a change from a previously requested weight-set;
7 calculating a weight-set metric for the weight-set based at least on the
8 measurement and transition probabilities and a prior weight-set metric; and
9 detecting a weight-set from a group of predetermined weight-sets based at
10 least on the weight-set metric to process the current time-slot.

1 2. The method of claim 1 further comprising using the detected weight-set
2 to combine multipath components of the current time-slot.

1 3. The method of claim 1 wherein the weight-set metric is a weight-set
2 metric for a current node of a trellis of nodes, and wherein calculating the weight-
3 set metric comprises:
4 calculating, for branches of the trellis leading to the current node, a branch
5 metric based at least on the measurement and transition probabilities;
6 calculating node metrics for the current node based at least on the branch
7 metric of a branch leading to the current node and a metric of a prior node
8 connected by the branch leading to the current node; and
9 selecting a greatest of the node metrics for the current node to correspond
10 with the weight-set metric for the current node.

1 4. The method of claim 3 wherein nodes of the trellis correspond with
2 weight-sets of the group of predetermined weight-sets.

1 5. The method of claim 3 wherein the selecting comprises selecting a node
2 from a plurality of nodes having the greatest weight-set metric, each node of the

3 plurality corresponding with one weight-set of the group of predetermined weight-
4 sets.

1 6. The method of claim 1 wherein determining the measurement
2 probability includes determining the measurement probability for each weight-set
3 of the group of predetermined weight-sets based at least on received amplitude
4 and phase measurements of the current time-slot.

1 7. The method of claim 1 wherein determining the measurement
2 probability for the weight-set further comprises estimating a probability for each
3 weight-set of the group of predetermined weight-sets for the current time-slot by
4 measuring received pilot symbols of a dedicated physical channel (DPCH) and a
5 continuous pilot channel (CPICH).

1 8. The method of claim 1 wherein the group of predetermined weight-sets
2 include at least one of the weight-sets used by a base station in transmitting the
3 current time-slot in diversity mode.

1 9. The method of claim 1 wherein the transition probability is determined
2 from a probability that a weight-set was changed from other weight-sets of the
3 group of predetermined weight-sets and based at least on feedback previously
4 provided by a receiver to a transmitter.

1 10. The method of claim 9 wherein the feedback is comprised of at least
2 one feedback bit previously transmitted by a mobile unit for use by a base station
3 in transmitting the current time-slot.

1 11. The method of claim 1 further comprising determining channel taps
2 from the selected weight-set for use in combining multipath components of a
3 channel during the current time-slot.

1 12. The method of claim 1 wherein each weight of a weight-set has a
2 phase and amplitude component.

1 13. The method of claim 1 further comprising repeating the determining of
2 the measurement and transition probabilities, calculating the weight-set metric and
3 detecting a weight-set for a next time-slot, wherein the determining of the
4 transition probability uses the weight-set metrics from the current time-slot as a
5 prior time-slot.

1 14. A processor comprising:
2 a metrics calculation element to determine a measurement probability for a
3 weight-set from measurements of a current time-slot, to determine a transition
4 probability for the weight-set, the transition probability based at least on a change
5 from a previously requested weight-set, and to calculate a weight-set metric for
6 the weight-set based at least on the measurement and transition probabilities and a
7 prior weight-set metric; and
8 a weight detection element to select a weight-set from a group of
9 predetermined weight-sets based at least on the weight-set metric to process the
10 current time-slot.

1 15. The processor of claim 14 wherein the weight-set metric is a weight-
2 set metric for a current node of a trellis of nodes, and wherein the metrics
3 calculation element calculates the weight-set metric includes:
4 calculating, for branches of the trellis leading to the current node, a branch
5 metric based at least on the measurement and transition probabilities; and
6 calculating node metrics for the current node based at least on the branch
7 metric of a branch leading to the current node and a metric of a prior node
8 connected by the branch leading to the current node,
9 and the weight detection element selects a greatest of the node metrics for
10 the current node to correspond with the weight-set metric for the current node.

1 16. The processor of claim 14 wherein the metrics calculation element
2 determines the measurement probability for each weight-set of the group of
3 predetermined weight-sets based at least on received amplitude and phase
4 measurements of the current time-slot.

1 17. The processor of claim 14 wherein the metrics calculation element
2 determines the measurement probability by estimating a probability for each
3 weight-set of the group of predetermined weight-sets for the current time-slot by
4 measuring received pilot symbols of a dedicated physical channel (DPCH) and a
5 continuous pilot channel (CPICH).

1 18. The processor of claim 14 wherein the metrics calculation element
2 determines the transition probability from a probability that a weight-set was
3 changed from other weight-sets of the group of predetermined weight-sets and
4 based at least on feedback previously provided by a receiver to a transmitter.

1 19. A machine readable medium having program instructions stored
2 thereon for performing a method of processing spread spectrum channels when
3 executed within a digital processing device, the method comprising:
4 determining a measurement probability for a weight-set from
5 measurements of a current time-slot;
6 determining a transition probability for the weight-set, the transition
7 probability based at least on a change from a previously requested weight-set;
8 calculating a weight-set metric for the weight-set based at least on the
9 measurement and transition probabilities and a prior weight-set metric; and
10 detecting a weight-set from a group of predetermined weight-sets based at
11 least on the weight-set metric to process the current time-slot.

1 20. The machine readable medium of claim 19 wherein the weight-set
2 metric is a weight-set metric for a current node of a trellis of nodes, and wherein
3 calculating the weight-set metric comprises:
4 calculating, for branches of the trellis leading to the current node, a branch
5 metric based at least on the measurement and transition probabilities;
6 calculating node metrics for the current node based at least on the branch
7 metric of a branch leading to the current node and a metric of a prior node
8 connected by the branch leading to the current node; and
9 selecting a greatest of the node metrics for the current node to correspond
10 with the weight-set metric for the current node.

1 21. The machine readable medium of claim 19 wherein determining the
2 measurement probability includes determining the measurement probability for
3 each weight-set of the group of predetermined weight-sets based at least on
4 received amplitude and phase measurements of the current time-slot.

1 22. The machine readable medium of claim 19 wherein determining the
2 measurement probability for the weight-set further comprises estimating a
3 probability for each weight-set of the group of predetermined weight-sets for the
4 current time-slot by measuring received pilot symbols of a dedicated physical
5 channel (DPCH) and a continuous pilot channel (CPICH).

1 23. The machine readable medium of claim 19 wherein the transition
2 probability is determined from a probability that a weight-set was changed from
3 other weight-sets of the group of predetermined weight-sets and based at least on
4 feedback previously provided by a receiver to a transmitter.

1 24. A code division multiple access (CDMA) receiver comprising:
2 a dedicated channel measurement element to measure characteristics of
3 current time slots of a CDMA channel;
4 a metrics calculation element to calculate metrics for weight sets estimated
5 to have been used in transmitting each of the current time slots, the metrics
6 calculated from the measured characteristics of the current time slots;
7 a weight detection element to select a weight set from a group of
8 predetermined weight sets based at least on the metrics for the weight sets; and
9 a channel tap calculator to generate channel taps from the selected weight-
10 sets.

1 25. The CDMA receiver of claim 24 wherein the metrics calculation
2 element calculates metrics for weight sets based at least on a measurement
3 probability for each weight-set from measurements of one of the current time-slot,
4 and a transition probability for the weight-set, wherein the transition probability is
5 based at least on a change from a previously requested weight-set.

1 26. The CDMA receiver of claim 24 further comprising:
 2 a pilot channel measurement element to measure the a channel; and
 3 a weight selection element to select a channel weight set from a pilot
 4 channel measurement, wherein the weight selection element provides feedback to
 5 a transmitter based at least on the selected channel weight set for use in
 6 subsequent transmissions to the receiver by the transmitter.

1 27. The receiver of claim 24 further comprising:
 2 despreaders to despread received spread spectrum signals with spreading
 3 codes; and
 4 a rake receiver to weigh and combine multipath components of the
 5 received spread spectrum signals using the channel taps provided by the channel
 6 tap calculator.

1 28. The receiver of claim 25 wherein each weight-set metric is a weight-
 2 set metric for a current node of a trellis of nodes, and wherein the metrics
 3 calculation element calculates metrics for weight-set by calculating, for branches
 4 of the trellis leading to the current node, a branch metric based at least on the
 5 measurement and transition probabilities, and calculating node metrics for the
 6 current node based at least on the branch metric of a branch leading to the current
 7 node and a metric of a prior node connected by the branch leading to the current
 8 node,
 9 and wherein the weight detection element selects a greatest of the node
 10 metrics for the current node to correspond with the weight-set metric for the
 11 current node.

1 29. The receiver of claim 24 wherein the dedicated channel measurement
 2 element, the metrics calculation element, the weight detection element, and the
 3 channel tap calculator are functional elements of a processor.